

Defining ultimate resolution
The DCFL gun

The electron gun of the Cybertube+ High Definition tube contains many features that combine to guarantee the outstanding sharpness of the three electron spots and ensure that the full potential of the tubes fine-pitch shadow mask and high-frequency deflection yokes is realized.

Features such as:

- **Improved Oxide Plus cathodes** that allow exceptionally high beam current densities without compromising spot sharpness,
- **Dynamic Beam Forming** providing near perfect spot geometry
- **Dynamic Focusing** that provides scan-dependent modulation of the focusing voltage to maintain perfect beam focusing over the whole scanned area.

And the latest, exciting innovation from LG.Philips Displays

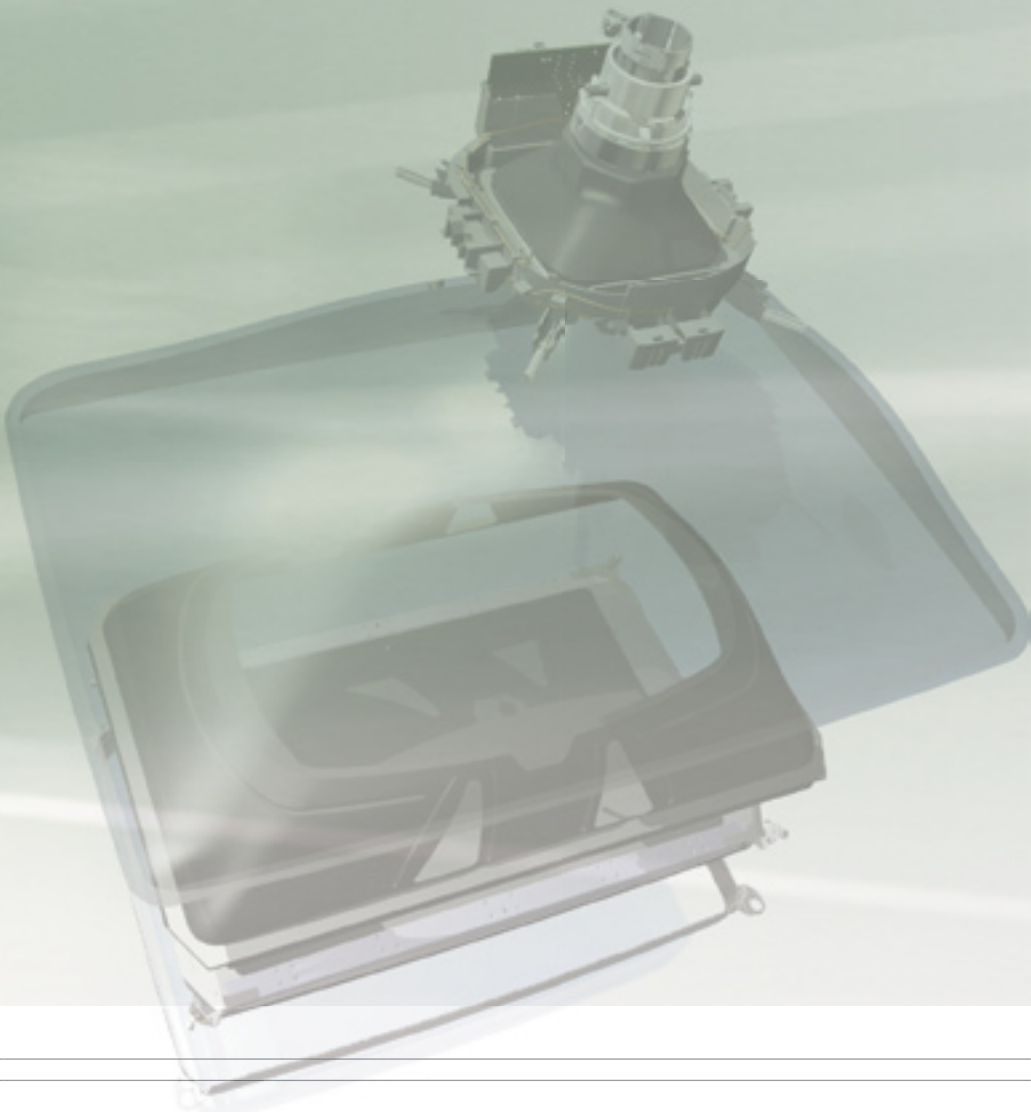
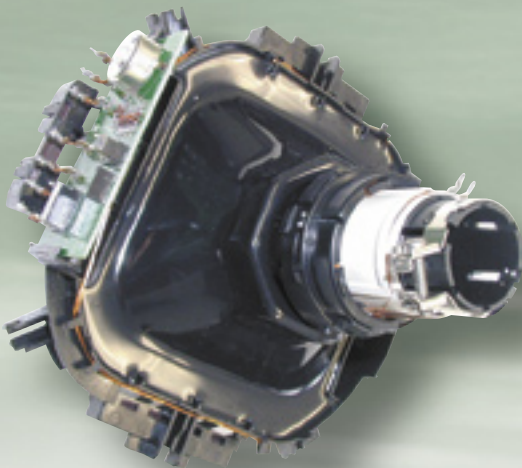
- the **Distributed Composed Field Lens** that minimizes aberrations in the electron optical system to produce an electron spot that is sharper and cleaner than ever before...

.... and providing for each separate colour **megapixel resolution** over the whole television screen even at beam current as high as 2 milliamps.

High deflection frequency
The new rectangular (RAC)
deflection yoke

Our new RAC rectangular deflection yoke, based on proprietary winding technology, minimizes deflection energy by moving the current-carrying wires of the deflection coils closer to the electron beams. This allows for higher scanning frequencies up to 48 kHz with minimal heating of the windings...

.... dramatically increasing the number of TV scanning lines and easily meeting the HD 720 p and 1080i High Definition standards.



Real Flat High Definition Colour Picture Tubes

The ultimate in today's picture performance



Gets the most out of DVD, HD and Digital signals and TV signal improvements



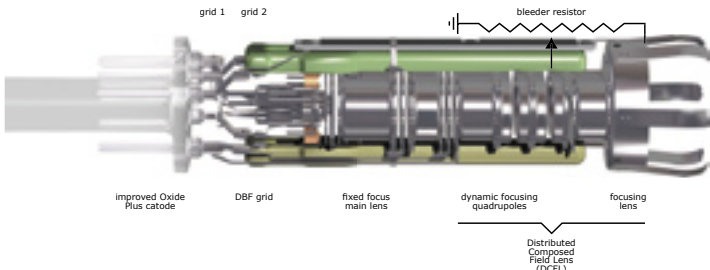
Excellent picture performance



Fast and easy design-in



www.lgphilips-displays.com



Cybertube+ benefits:

- Excellent picture performance
- Fast and easy design-in for short time to market

The route to High Definition TV

Digital technology is the driving force in the consumer industry to bring new and improved products to the end user.

- For the television industry, in particular, it will have major impact due to
- digital TV broadcasting in Standard and High Definition
 - the use of high quality picture sources such as DVD video...
 - and the use of image improvement techniques by the set manufacturers.

These have all increased the demands on colour picture tube performance.

Our Cybertube+ High Definition colour picture tube range, with its unique combination of features, has been designed specifically to meet these demands. Providing set manufacturers with the surest route to the world of High Definition TV.

The best there is in real flat

More than 10 years' know-how and experience in developing and manufacturing Real Flat products are combined in our new Cybertube+ range of full-featured, Real Flat colour picture tubes. A range that sets the standard for a new era of high-quality display products.

Real Flat, high performance

Cybertube+ combines a truly flat screen with excellent focus and convergence performance across the entire display area. It also offers outstanding brightness and contrast, and robust, high-quality construction reduces microphony to a minimum.

Designed to meet the challenge of the new Digital Television environment, Cybertube+ embodies a whole range of leading-edge technologies...

.... Creating an image that is so lifelike, it's like looking through a window!

Plus fast, easy design-in

Cybertube+ offers not just outstanding performance but important design-in benefits too.

The need for flat screens can result in complex chassis solutions to provide the desired geometrically perfect picture. We have extensively researched this application area with the result that our Cybertube+ range can be used in existing TV chassis without any major modifications...

The perfect flat picture with Double Curved Mask technology

Developing a Real Flat screen in CRT technology is not just a matter of making the front of the television screen flat. Other factors too have to be considered to ensure that the picture on the screen remains natural and easy to view.

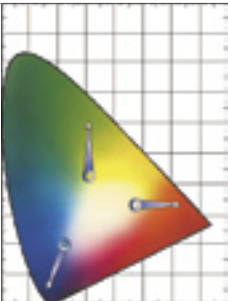
After extensive evaluation of different technical approaches, we chose the Double Curved Mask (DCM) concept for Cybertube+.

DCM uses an optimized flat clear-glass screen with a lightly-curved inner surface, plus a double curved shadow mask with a curvature that perfectly matches the curvature of the inner screen surface. This allows very close spacing between the shadow mask and the screen, leading to:

- exceptionally good white uniformity
- improved raster performance and geometry – minimizing the number of components needed for East-West correction.
- high picture brightness since the closer mask-to-screen spacing results in more accurate targeting of the electron beams on the red green and blue phosphors.

The lightly-curved inner screen surface of the DCM tube also means that the glass is thinner than with a conventional Real Flat tube and absorbs less light, further contributing to brighter television picture.

Kelly chart



What's more, DCM technology results in a highly stable mask structure that suffers far less from *microphony* than other mask designs such as tension or aperture grill masks. Offering further benefits to set manufacturers by allowing them the possibility of integrating powerful hi-fi audio systems in their sets without any danger of these systems affecting the television picture.

Bright, true-to-life colours with highly-pigmented red, green and blue phosphors

To guarantee excellent colour reproduction, in our Cybertube+ tubes we use highly-pigmented phosphors containing denser pigments than conventional phosphors. The higher colour saturation of these phosphors produces a far more striking and realistic colour impression...

.... creating pictures that are so lifelike, they are indistinguishable from reality.

Highly-pigmented phosphors are also very efficient. Their higher light output results in brighter television pictures without any loss of contrast. And since they reflect less ambient light back into the room, they also give better daylight contrast.

The high definition concept

In recent years TV viewing expectations have increased dramatically with the introduction of high-quality programme sources such as DVD-Video, HDTV and digital broadcasting. Supporting set manufacturers in meeting these expectations, **Cybertube+ High Definition**, the latest addition to our Cybertube+ range, offers the ultimate in today's picture tube technology. Cybertube+ High Definition tubes provide major improvements in resolution with the use of

- a **fine pitch mask**
- our new ultra-high resolution **Distributed Composed Field Lens (DCFL)** electron gun that provides a uniform smaller spot size at all positions on the screen
- a **rectangular (RAC) deflection yoke** giving high horizontal scan rates ranging from 32 kHz to 48 kHz, covering all anticipated Digital TV application requirements.

Combined with DCM technology and highly-pigmented phosphors, the unique combination of features that make up Cybertube+ High Definition brings to set manufacturers a product that is without doubt at the very forefront of today's High Definition picture-tube technology...

.... providing outstanding television picture quality and a viewing experience that is virtually indistinguishable from reality.

Extending the limits of pixel resolution

Mask pitch is used by many manufacturers as a measure of picture tube resolution. But a fine-pitch mask alone does not assure high resolution when the scanning electron spot covers several mask slots, because individual pixels will then overlap each other and fine picture details will be lost.

What's more, very fine pitch also reduces the transmission of the mask. This means beam current must increase to maintain adequate screen brightness, which in turn will further increase electron-spot size and reduce resolution.

So the key to high resolution in a colour picture tube and the approach we have followed in our Cybertube+ High Definition range is to provide a balance between

- electron spot size
- mask pitch
- and the number of horizontal scanning lines to assure a maximum number of non-overlapping pixels.

The super-small electron spot produced by our new DCFL electron gun provides the perfect complement to the fine-pitch shadow mask of the Cybertube+ High Definition range. Combining this with our new high-frequency rectangular deflection unit capable of generating 720 horizontal scanning lines results in a screen resolution that offers the highest number of visible pixels ever displayed by a television tube!

Compare the television picture on the left produced by a standard electron gun and a fine pitch mask with the picture on the right produced by the new balanced approach of Cybertube+ High Definition...

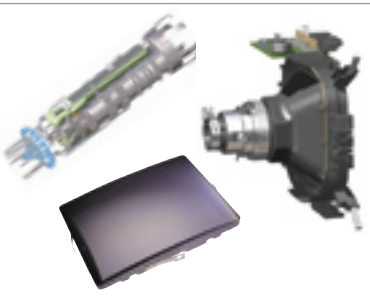
.... combining the fine pitch mask, the Distributed Composed Field Lens electron gun and the new high-frequency deflection yoke.

You really have to see the difference to believe it!

Cybertube+ High Definition



HD-concept building blocks



optimal harmony between gun, deflection yoke and fine pitch mask

Pitch compare

electron beam narrow electron beam



high number of addressable pixels unresolved by the eye

resolvable pixels